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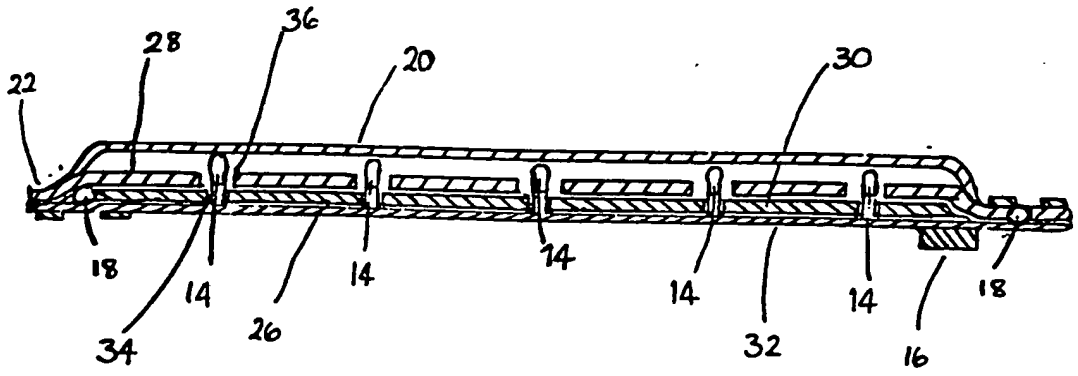

(57) Abstract

The invention provides that a visibility aid (2) is provided which provides an improved visibility to the object, person r animal to which it is affixed. A flexible sheet f material is provided with light source means (14) mounted therein such that the material, which may include reflective properties, is visible to nlookers upon the illumination f said light source means (14). Provisi n may also be provided f r the inclusion therein of an automatic switching mechanism (18).

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Visibility Aid

The present invention relates to a visibility aid, and improvements thereto; the said visibility aid adaptable to be worn by people, animals or attached to inanimate objects. The said visibility aid is designed such that the visibility of the object to which it is attached is enhanced by use of the aid. Environments which are in darkness or of poor visibility due perhaps to fog or smoke, would be particularly suitable for use of the visibility aid therein. In this specific case reference is made to the instance where the visibility aid is worn on the person, with the effect described repeated for whichever object it may be attached to.

It is desirable for a person to be visible in the dark and for there to be a means at their disposal by which they can indicate to others their presence and location. To meet this there are several visibility devices currently available which are designed such as to enhance the visibility of the person wearing the visibility device. There has been shown to be a considerable demand for such devices and the demand for improvements in such devices is constant.

Of the existing said visibility devices the majority consist of bands of reflective material which can be worn on the body or, as an alternative, outer garments may be manufactured from said reflective material to form an entirely reflective article of clothing.

The said visibility devices have the disadvantage that they require illumination from a source external to the visibility device. With no xternal light source available the effect of

the visibility device is nullified. A further disadvantage of the said visibility devices are that they merely mirror the external light source and afford the device wearer no control over the form or intensity of reflection given out. This control over the reflective power of such visibility devices is desirable especially if it is desired that the reflection be minimised, for whatever reason.

In order to overcome the stated disadvantages a visibility aid has been developed with the aim of providing an enhanced visibility and reflection to the wearer and also providing to the wearer control of the said visibility aid.

The present invention provides a visibility aid in the form of reflective material, with one or more light source means mounted thereon, wherein the light source means , when illuminated, interact with the reflective characteristic of the material to increase the visibility of the said visibility aid.

The said reflective material shall be in the form of reflective sheet material suitable for attachment to or carried by a person or object.

The said visibility device shall include an electrical circuit therein and shall be adapted to be worn or placed on an object such that when contact to complete an electrical circuit is made, a power source acts to illuminate the said light source means and thus increase the visibility of the wearer or object.

The sheet of material shall have retroreflective properties and will be positioned to cover the said light sourc s means,

wherein the light source means protrude through the backing material of the said retroreflective material, such that a multiplicity of lights are apparent to the onlooker.

In a further embodiment the light source means shall be mounted such that the retroreflective material is placed behind the said light sources with a protective layer of plastic material over the said light source means.

The effect of the mounting of the light source means, upon illumination, both in front of or behind the retroreflective material is to produce a multiplicity of said lights which are apparent to the onlooker, such a multiplicity enhancing the overall light effect produced upon the illumination of the said light source means such that the value of such a device is greatly enhanced and the inherent safety factor increased. The multiplication of the lights is due to the property of the retroreflective material which, by the reflection of light either therethrough or thereon produces the multiplicity of lights which is visible to the onlooker.

The light source means shall be integral parts of an electrical circuit connected to a power source such that should one light source means fail the remainder of light sources will continue to operate.

The power source may be mounted as an integral part of the visibility aid and said power source may take the form of batteries which in one embodiment may be rechargeable by solar power panels mounted on the said aid.

The completion of the electrical circuit of the visibility aid may be provided by magnetic means mounted such that when

the two ends of the band are brought into contact the circuit is completed.

The magnetic means so described may be in the form of a reed switch mounted at one end of the band and a magnet mounted in the opposing end such that the reed switch contact is closed upon the positioning of the magnet in proximity thereto.

The said electrical circuit may be designed to include a flasher unit such that the lights will flash intermittently upon the circuit being completed.

The band may be provided with an adjustment mechanism so that it may be worn or attached to persons or articles of differing dimensions.

The visibility aid shall be capable of attachment to inanimate objects such that their location is indicated to onlookers.

The light sources may be mounted on metallic foil to further enhance the effect of the light sources when lit.

The visibility aid shall be waterproof and water resistant and the said electrical circuit shall be prevented from being exposed outwith the said aid.

An embodiment of the improved visibility aid is described below by way of example and with reference to the acompanying drawings wherein:

Figure 1 is a plan view of the Visibility Aid;

Figure 2 is a sectional view of the visibility aid of Figure 1 along line A-A; and

Figure 3 is an elevation of the automatic switching device.

Describing one embodiment of the invention with reference to the drawings and firstly to Figures 1 and 2 which show the visibility aid 10 which comprises a reflective band 12 within which are mounted light source means 14. The said light source means are powered by means of a power source 16, the power transmitted to the light source means 14 by means of an electrical circuit (not shown). Serving to complete the electrical circuit is an automatic switching device 18. The ends of the said visibility aid are fastened together with the aid of strips of VELCRO 17. Covering the said light source means is the outer part 20 formed of retroreflective material which serves to produce an enlargement of the illuminated light 24 produced by each of the light source means 14. This enlargement is produced by the multiplication of the number of illuminated lights visible, said multiplication dependant on the form of retroreflective fabric fitted and also the distance of the light source means 14 therefrom.

Figure 2 illustrates the method of mounting the light source means 14 in the visibility aid and the various layers of material so joined to form the visibility aid. The light source means 14 are mounted such that they are connected by electrical wiring 26 to the electric circuit with the light source covered by the outer part 20 of retroreflective material. The inner part 28 of the material is placed on top of a layer of aluminium foil 30 which in turn is covered by a backing band of mat rial 32 so sealed at each side with

the outer part 20 of retroreflective material to form a sealed watertight join. The light source means 14 and associated wiring are mounted between the backing band 32 and the layer of aluminium foil 30, with small holes 34 cut in the said aluminium foil to allow the upper part of the light sources 14 to pass therethrough. The upper part of the light sources in turn passes through a hole 36 of larger diameter cut in the inner part 28 , such that the said light source is visible externally.

One form of switch for the visibility aid, the automatic switching device is shown in more detail in Figure 3 wherein there is shown the reflective band 12 and mounted thereon the strips of VELCRO 17. Within one end 38 of the said reflective band there is mounted a reed switch 40 and in the other end 42 a magnet 44. The said reed switch connected to the main electrical circuit of the said visibility aid.

The operation of the visibility aid 10 is relatively simple in that the said aid, when to be worn is placed around, for example, the arm and the two ends 38 and 42 are fastened together by means of the VELCRO fastenings 17. The light sources are not illuminated until the two ends 38 and 42 are brought in to close proximity as shown in Figure 3 such that when this occurs the magnet 44 serves to close the contact 46 of the reed switch 40. The closure of the contact 46 serves to complete the electrical circuit and so the power from the power source 16 is supplied by the electrical circuit to the light sources 14 which are illuminated. When it is desired that the light sources 14 be extinguished the two ends 38 and 42 are moved apart such that the contact 46 of the reed switch 40 is opened and the power source disconnected from the light sourc s.

As an alternative embodiment the inner part referred to as 28 shall be formed of retroreflective material and the outer part 20 shall be formed of a protective plastic coating ,said light source means thus mounted in front of the said retroreflective element of the inner part 28.

It shall also be possible to alter the distance between the said light source means 14 and the retroreflective part such that the optimum multiplicity of lights is produced and the optimum light effect can be obtained.

In a further embodiment the automatic switching device shall not be incorporated into the visibility aid and the operation of the light source means shall be by manual means.

The visibility aid shall use the sheet material integrally with the said light source means such that the device is adaptable for use in differing conditions and environments and can be attached to articles and persons of varying dimensions.

The visibility aid so described has the advantage of incorporating light sources to provide a light source within the said reflective device thereby eliminating the need for external lighting before the visibility aid is of use.

The simplicity of the automatic switching mechanism is of great advantage when used in emergency situations wherein the user wishes to quickly and simply switch on the said light sources, this being effected by the same movement used in the fitting of the said visibility aid to the person. Furthermore the fact that the automatic switch is wholly encased within th visibility aid itself decr ases the risk of damage to th

said switch when the visibility aid is being used especially when in use in hazardous conditions. The fact that the switch automatically disconnects the power from the light ources upon the removal of the visibility aid serves to save power drain from the power source which could occur if for example the switch was manually operated and the wearer forgot to switch the power supply off upon ceasing to wear the visibility aid.

Claims

1. A visibility aid comprising at least one light source means mounted in conjunction with reflective material, such that, when the said light source means are illuminated, the light produced interacts with the reflective characteristic of the said reflective material and so serves to increase visibility.

2. A visibility aid as in claim 1 wherein the reflective material is in the form of flexible sheet material for attachment to or carried by persons or inanimate objects.

3. A visibility aid as in Claim 1 wherein the said reflective material has at least one surface with retroreflective properties.

4. A visibility aid as in Claim 1 and 3 wherein a said retroreflective surface is mounted in front of the said light source means.

5. A visibility aid as in Claim 1 and 3 wherein the light source means are mounted in front of a retroreflective surface such that when light source means are illuminated a reflection is obtained from the retroreflective surface.

6. A visibility aid as in Claim 1 wherein the light source means are connected by electrical circuitry to a power source such that when the circuit is complete the lights are illuminated.

7. A visibility aid comprising a band of material, an

electrical circuit including at least one light source means connected thereto, fitted within the said band of material, a power source connected to the electrical circuit and a switching device to complete the said electrical circuit wherein the said switch is automatically operated.

8. A visibility aid as in Claim 7 wherein the said band of material includes a strip of reflective material the outer part of which covers the said light sources, wherein the light sources protrude through the inner part of the said reflective material.

9. A visibility aid as in claims 7 and 8 wherein the said reflective material outer part has retroreflective properties.

10. A visibility aid as in claims 7 and 8 wherein at least the inner part of the reflective material has retroreflective properties.

11. A visibility aid as in claim 7 wherein the switch is automatically operated by magnetic means mounted such that when the two ends of the visibility aid are brought into close proximity the circuit is completed.

12. A visibility aid as in claim 11 wherein the magnetic means so described may be in the form of a reed switch mounted at one end of the visibility aid and a magnet mounted at the opposing end.

13. A visibility aid as in Claim 7 wherein the two ends of the said visibility aid may be fastened by the use of VELCRO fastenings fitted to the said visibility aid.

14. A visibility aid as in claim 7 wherein the aid is capable of being worn on the person or attached to inanimate objects.

15. A visibility aid as in any of the preceding claims wherein there is a plurality of light sources connected such that upon failure of one or more light source the remaining light sources will continue to operate.

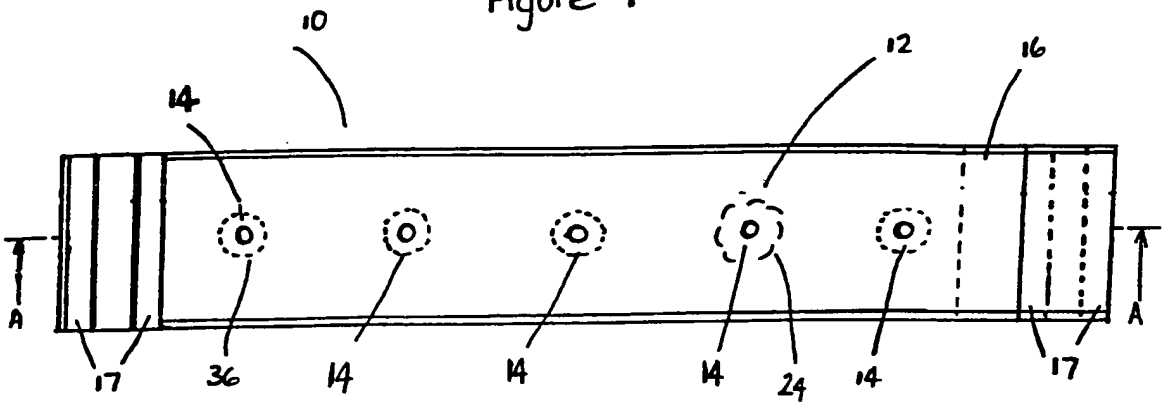
16. A visibility aid as in any of the preceding claims wherein the said light source means are illuminated intermittently by the introduction in to the electrical circuit of a flasher unit.

17. A visibility aid as in any of the preceding claims wherein the light source means are mounted on metallic foil to enhance the effect of the light sources when illuminated.

18. A visibility aid as in any of the preceding claims wherein the said aid is waterproof and water resistant and the said electric circuit and power source are not exposed externally.

19. A visibility aid as claimed in the preceding claims and as described in the accompanying drawings and description.

Figure 1



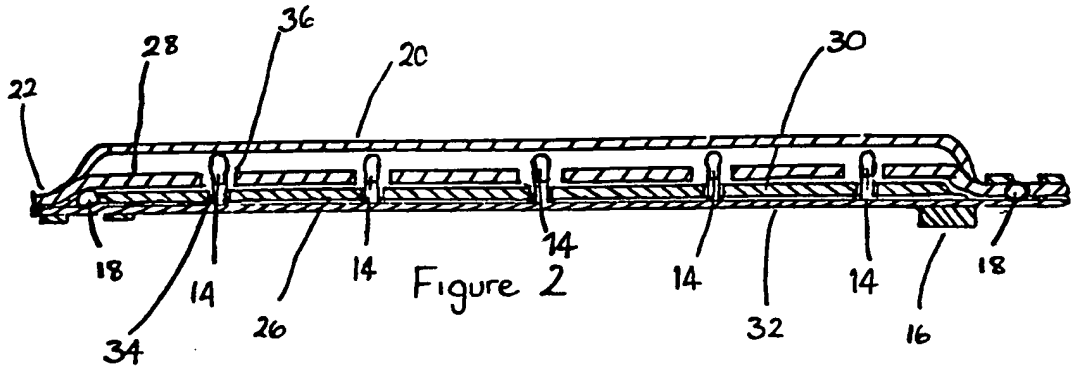
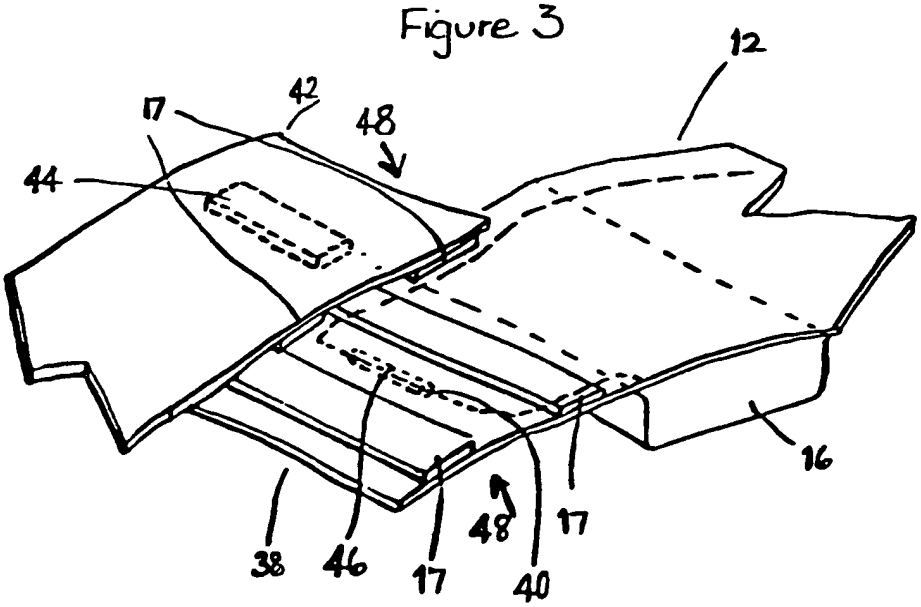


Figure 2

Figure 3



INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 91/00753

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC[5]: G 08 B 5/00, F 21 L 11/00, G 09 F 21/02

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC[5]	G 09 F, F 21 L, G 08 B

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category [10]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	US, A, 4812953 (W. ASK et al.) 14th March 1989 see column 3, line 21 - column 5, line 32 ; Figures 1-4	1-5,9,10,18, 19
Y		6,7,11-16

Y	US, A, 3641333 (E. GENDRON) 8th February 1972 see column 1, line 45 - column 2, line 65; Figures 1-4	6,7,11-16

X	FR, A, 2529296 (H. MARCHEVSKY) 30th December 1983 see page 5, line 25 - page 6, line 3; Figures 1-7	1,2,6-9, 14-16,19
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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
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Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
P,X	GB, A, 2228512 (M. MANSFIELD) 29th August 1990 see the whole document	1-7,14-16, 19
X	DE, U, 8900718 (J.DAMBROTH) 24th May 1989 see the whole document	1-6,9,10, 14-16,19
X	EP, A, 0166534 (INFRATRON) 2nd January 1986 see page 2, line 7 - page 3, line 2; Figures 1-8	1-6,16-19

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. GB 9100753 SA 47369

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 4812953	14-03-89	None	
US-A- 3641333	08-02-72	None	
FR-A- 252929		None	
GB-A- 2228512	29-08-90	None	
DE-U- 8900718	13-04-89	None	
EP-A- 0166534	02-01-86	None	